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## ANALYSIS OF CONCEPTION RATES AND OTHER DATA IN ARTIFICIAL INSEMINATION*


BY

A. F. HOLT, B.SC. (AGRIC.), M.R.C.V.S.,
DARTINGTON HALL CATTLE BREEDING CENTRE, TOTNES


The Dartington Hall Cattle Breeding Centre commenced operations in January, 1944, being one of the earliest Centres to offer a commercial service of artificial insemination to farmers. A sub-centre at Liskeard in Cornwall was opened in December, 1946, and a further sub-centre started operating in the autumn of 1947 at Tavistock. South Devon bulls only are kept at the main centre and until the end of 1946 this was the only breed available to members. With increased demand it became necessary to offer service with semen of other breeds and for this reason semen was imported from other Centres.

From the earliest days of the operation of the Centre full records have been kept ; the data and conclusions which can be drawn are set down below although explanation of some of the expressions used must be given at this stage. Except where otherwise stated the figures refer to first inseminations only, this being the accepted basis for conception rate analysis in A.I. work. The conception rate is expressed as a percentage of cows holding at various periods after insemination. The " conception rate at three weeks " is the figure obtained on one calendar month's insemination calculated after each cow has had time to return at least once, *i.e.*, 21 days after the last day of that month. Thus the conception rate for, say, January is calculated on February 21st and allows for all returns from January inseminations up to and including this day. This means, of course, that those cows inseminated at the beginning of the month have had time to return on two occasions. The " six weeks " conception rate is calculated 21 days after the " three weeks " figure and three weeks after this the " nine weeks " figure is obtained. The " 12 weeks " or " three months " figure is taken 12 weeks from the end of the appropriate month which, in the case of January, would be calculated on April 25th.

The above methods of expression are of course only " presumed " conception rates and in addition a " calving " conception rate is calculated. This is the " true " figure and is based on information collected from the owner of each cow inseminated. In order to obtain these data calf cards were sent to each owner at the time a cow was due to calve asking for details of the calving. Although some difficulty was experienced, the Centre traced practically all inseminated cows and found out whether or not the cow did calve. The figures quoted in the conception rate include what might be better termed " pregnancies " since recognisable abortions were counted as being indicative of successful inseminations.

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### 1. THE RELATIONSHIP OF PRESUMED CONCEPTION RATE TO THE TRUE OR CALVING CONCEPTION RATE

Since it is an obvious advantage to calculate a conception rate as soon as possible after insemination, the three-weekly figure seems to satisfy this requirement, but the figure arrived at has no significance unless it can be correlated with the standard three-monthly conception rate and with the actual conception as shown by recognisable pregnancies. With the object of reaching a conclusion, figures were prepared to show any connection which might exist :—

TABLE I

FALL IN CONCEPTION RATE OF SOUTH DEVON SEMEN AT 3 WEEKS, 6 WEEKS, 9 WEEKS, 12 WEEKS TO CALVING

| Year | Number of first inseminations | Conceptions 3 weeks | Conceptions 6 weeks | Conceptions 9 weeks | Conceptions 12 weeks | Calving conceptions | Fall in conception rate 3 to 12 wks. | 12 calving | 3 calving |
|---|---|---|---|---|---|---|---|---|---|
| Dartington : | | | | | | | | | |
| 1944 ... ... | 1,129 | 69·4 | 62·7 | 59·3 | 57·5 | 46·9 | 11·9 | 10·6 | 22·5 |
| 1945 ... ... | 2,223 | 73·0 | 65·9 | 63·7 | 62·4 | 52·7 | 10·6 | 9·7 | 20·3 |
| 1946 ... ... | 3,971 | 80·3 | 74·5 | 71·6 | 70·1 | 60·9 | 10·2 | 9·2 | 19·4 |
| 1947 ... ... | 5,388 | 76·1 | 68·2 | 65·0 | 63·5 | 55·7 | 12·6 | 7·8 | 20·4 |
| 1948 ... ... | 6,976 | 80·6 | 74·8 | 71·7 | 69·9 | 62·9 | 10·7 | 7·0 | 17·7 |
| | 19,687 | 77·8 | 71·3 | 68·3 | 66·6 | 58·5 | 11·2 | 8·1 | 19·3 |
| Liskeard : | | | | | | | | | |
| 1947 ... ... | 2,752 | 75·0 | 67·3 | 63·6 | 62·2 | 54·6 | 12·8 | 7·6 | 20·4 |
| 1948 ... ... | 5,427 | 77·1 | 70·7 | 67·5 | 65·7 | 59·6 | 11·4 | 6·1 | 17·5 |
| | 8,179 | 76·5 | 69·6 | 66·2 | 64·5 | 57·9 | 12·0 | 6·6 | 18·6 |
| Tavistock : | | | | | | | | | |
| 1948 ... ... | 1,516 | 75·2 | 67·6 | 63·9 | 61·7 | 54·8 | 13·5 | 6·9 | 20 4 |
| Total all centres : | | | | | | | | | |
| 1944 ... ... | 1,129 | 69·4 | 62·7 | 59·3 | 57·5 | 46·9 | 11·9 | 10·6 | 22·5 |
| 1945 ... ... | 2,223 | 73·0 | 65·9 | 63·7 | 62·4 | 52·7 | 10·6 | 9·7 | 20·3 |
| 1946 ... ... | 3,971 | 80·3 | 74·5 | 71·6 | 70·1 | 60·9 | 10·2 | 9·2 | 19·4 |
| 1947 ... ... | 8,140 | 75·8 | 67·9 | 64·6 | 63·1 | 55·3 | 12·7 | 7·8 | 20·5 |
| 1948 ... ... | 13,919 | 78·7 | 72·5 | 69·3 | 67·4 | 60·8 | 11·3 | 6·6 | 17·9 |
| | 29,382 | 77·3 | 70·6 | 67·5 | 65·8 | 58·1 | 11·5 | 7·7 | 19·2 |

The main points which can be seen from the data are that :—

(*a*) The fall from 8 to 12 weeks is uniformly similar in all years and it would appear that a deduction of approximately 11 per cent. from the three weeks' figure will give a fair indication of what the three-monthly figure will be.

Edwards (1950) reports that in 1949–50 the difference between a conception rate taken one clear month after the end of the month under review and that taken at two months is 6·7 per cent. ; the three-month figure is 2 per cent. lower, so that an 8·7 per cent. fall occurs between the one- and the three-month figures. These figures, although extracted at slightly different periods from those at Dartington, do bear some relation to them.

(*b*) Similarly, a fall of between 7 and 8 per cent. can be expected from the three-monthly figure to the true conception rate, giving an over-all drop from three weeks to calving of 18 to 19 per cent. The fall from three months to calving conception corresponds closely with that reported by Clark (1949), who, in home-produced semen, found it to be 9·2 per cent. ; Stewart (1950) also reports similar findings at the Reading Centre.

(*c*) The fall from three to six weeks is in the region of 6·5 to 7 per cent.

(*d*) The fall from six to nine weeks is 3 to 3·5 per cent.

(*e*) The fall from 9 to 12 weeks is about 1·7 per cent.

It is notable that the three to six weeks' fall varies more that the six to nine weeks', and that the 9 to 12 weeks' drop varies very little over the five years surveyed.

Although the data for the Tavistock sub-centre are for one year only and represent a smaller number of cows than the other two centres, the relationship between the various conception rates is broadly the same.

There is a small but significant difference between the conception rates at Dartington main centre and those at the two sub-centres. This is due to the fact that semen at the sub-centres was used one day older than at the main centre. This difference is also reported by Edwards (1949) where a fall of 2·7 per cent. occurs from the main centre conception to that of the sub-centre. It is necessary to point out, however, that when comparing conception rates of centres and sub-centres two important facts must be remembered. The herd fertility problem may vary between each group and, in addition, due consideration must be given to the conception rates of individual inseminators, particularly where a sub-centre employs only a small number of operators.

## 2. Yearly Variation of Relationship

Data were examined in order to ascertain whether or not the correlation between presumed and actual conception rates was static over successive years. Since the main centre has been in operation for the longest period these figures are used (Table I and Graph 1).

Statistical examination has shown that there has been a significant increase in the calving conception rate over the five-year period. Part of this improvement is associated with a decrease in the proportion of cows returning to oestrus at three weeks, *i.e.*, an improved three-weekly conception figure. This was to be expected and is due almost entirely to increased technical efficiency. Another apparent reason for the improvement in the calving conception is the progressively smaller fall between the three-monthly conception and the calving figure because of a smaller number of animals returning for service more than three months after the first insemination. On the other hand, the fall from three weeks to three months did not change materially throughout the five-year period. A possible explanation of this is that more farmers are making fuller use of the A.I. service in that a smaller proportion of cows are being served naturally after one failure with A.I. and a higher proportion returning for a further artificial service. By this means information of returns is received by the centre and is recorded whereas, in

the case of natural service following insemination failure, no return is notified until calving is due and this is at a date after the three-month conception rate has been calculated ; this in turn results in a higher figure at three months than should actually be the case. Nevertheless, this does not give a complete answer to the problem since under these conditions the difference between the three-weekly and three-monthly figures should increase progressively over the five-year period, showing that the second insemination was being used ; this does not appear in the figures and a completely satisfactory explanation cannot be offered.

3. Variation of the Relation between Presumed and Calving Conception with the Season

The time of year did not have any effect of statistical significance in any year at any of the three centres. Graph 1 gives a picture of the conception rates during 1944–48 at the main centre and shows how close the relationship is between the figures at different seasons.

4. Seasonal Variations of Conception Rate

During the years 1944–48, season had no effect on conception rate at the main centre :—

Table II
Calving Conception Rates at Dartington

| Month | 1944 | 1945 | 1946 | 1947 | 1948 | Average |
|---|---|---|---|---|---|---|
| January | 46·3 | 27·7 | 65·9 | 61·6 | 62·8 | 58·4 |
| February | 60·8 | 40·9 | 62·1 | 49·2 | 62·1 | 56·2 |
| March | 44·2 | 34·0 | 62·5 | 50·3 | 61·3 | 54·1 |
| April | 38·9 | 45·0 | 62·5 | 43·0 | 62·2 | 53·4 |
| May | 54·4 | 49·7 | 64·2 | 52·1 | 60·2 | 57·1 |
| June | 48·5 | 54·5 | 64·7 | 52·5 | 57·5 | 56·7 |
| July | 45·9 | 52·7 | 63·5 | 60·2 | 62·9 | 60·6 |
| August | 54·8 | 63·7 | 60·1 | 58·1 | 64·7 | 61·4 |
| September | 37·4 | 60·8 | 58·0 | 54·3 | 64·0 | 58·2 |
| October | 54·6 | 60·4 | 62·5 | 61·1 | 65·2 | 62·2 |
| November | 50·3 | 65·3 | 56·4 | 56·3 | 65·7 | 60·1 |
| December | 37·1 | 67·1 | 53·9 | 61·1 | 65·4 | 59·7 |
| Average | 46·9 | 52·7 | 60·9 | 55·7 | 62·9 | 58·5 |

These figures give the picture at the main centre during the first five years of its operation and statistical tests show that the variation in calving conception is not affected by the season of the year since the changes shown in the last column are not consistent from year to year. See also Graph 1.

5. Study was made of The Difference between Conception to a First Insemination and that to a Second. Both the main and sub-centres are included in the figures. (See Table III.)

In the cases of Dartington and Liskeard the differences in the conception rates to a first and to a second insemination are highly significant ; that at Tavistock is not significant partly because of the smaller numbers involved. Reporting on work done in 1946, Stewart (1950) found the pregnancy conception to a second insemination to be 5·4 per cent. below that to a first, although here only one year is reported and no main and sub-centre comparisons are made. Barrett *et al.* (1948), reporting work done at the Wisconsin Experimental Breeding Project during 1945–47, state that, based on pregnancy diagnosis 35 to 49 days after insemination, the conception rate to first inseminations was 54·4 per cent. and to second 50·7 per cent., a difference of 3·7 per cent. At Dartington the difference has gradually increased over the five-year period until in 1948 it is 11·1, whereas at Liskeard it has remained fairly static with a mean of 3·9 (Table III).

6. Difference between Presumed and Actual Conception Rates to a Second Insemination

This can be illustrated by reference to Table IV (over-leaf).

Comparison with Table I shows that in 1948 the three weeks' conception rate to a first and to a second insemination showed only a small difference and that almost the only cause of the lower calving conception rate obtained with the second insemination was the large number of cows returning more than three months after the inseminations (12·4 per cent. fall compared with 6·6 per cent.). This is particularly marked at the Dartington Centre (15·3 per cent. fall compared with 7·0 per cent.). A lower calving conception rate to a second insemination than to a first is to be expected since the former group consists of a higher proportion of infertile cows, the majority of the fertile cows having held to the first insemination. This is partly because after failure to hold to second inseminations many are not reported for a further insemination but, instead, are either served naturally or fattened off with

Table III

| Year | Number of first inseminations | Calving conceptions | Number of second inseminations | Calving conceptions | % difference between first and second calving conception |
|---|---|---|---|---|---|
| Dartington : | | | | | |
| 1944 ... ... | 1,129 | 46·9 | 390 | 46·4 | 0·5 |
| 1945 ... ... | 2,223 | 52·7 | 930 | 46·2 | 6·5 |
| 1946 ... ... | 3,971 | 60·9 | 1,201 | 52·3 | 8·6 |
| 1947 ... ... | 5,388 | 55·7 | 2,104 | 46·9 | 8·8 |
| 1948 ... ... | 6,976 | 62·9 | 2,228 | 51·8 | 11·1 p = <0·001 |
| Total ... | 19,687 | 58·5 | 6,853 | 49·3 | 9·2 |
| Liskeard : | | | | | |
| 1947 ... ... | 2,752 | 54·6 | 897 | 50·1 | 4·5 |
| 1948 ... ... | 5,427 | 59·6 | 1,881 | 55·9 | 3·7 p = >0·001 — <0·01 |
| Total ... | 8,179 | 57·9 | 2,778 | 54·0 | 3·9 |
| Tavistock : | | | | | |
| 1948 | 1,516 | 54·8 | 538 | 51·7 | 3·1 p = >0·20 — <0·30 |

p = Probability of difference being due to chance : the value of " p " ceases to be significant when it falls below 0·01.

Table IV

| Centre | 1948 Figures Conception rate of second inseminations at | | | Fall in conception rate | |
|---|---|---|---|---|---|
| | 3 weeks | 3 months | Calving | 3 weeks to 3 months | 3 months to calving |
| Dartington ... ... | 78·9 | 67·1 | 51·8 | 11·8 | 15·3 |
| Liskeard ... ... | 78·0 | 65·6 | 55·9 | 12·4 | 9·7 |
| Tavistock ... ... | 77·7 | 62·6 | 51·7 | 15·1 | 10·9 |
| Weighted mean ... | 78·4 | 65·9 | 53·5 | 12·5 | 12·4 |

the results explained earlier in 2. Nevertheless, this does not explain why the difference should be so great at the main centre as compared with the sub-centre, and no reason for this or for the increasing difference over the years at Dartington can be offered.

## 7. Conception Rate Obtained by Inseminators

This has a direct bearing on the efficiency of the Centre and data are examined in order to see the position more clearly than hitherto. Some discussion has arisen on the time required by an inseminator to become efficient after having been given permission to inseminate cows by himself. Accordingly, the figures of 12 individual inseminators trained at this Centre and carrying on as operators after achieving Ministry of Agriculture approval have been taken for analysis. These 12 men were all employed between 1944 and 1949 and only the results of the first 12 months' work of each man are observed. The conception rates quoted are three-weekly ones.

Statistical analysis shows that the efficiency of the inseminator increases significantly during the first 12 months of his work. This is well illustrated by the quarterly figures at the bottom of Table V. Examination shows that a gradual rise of conception rate occurs for the first four months but that this is followed by a significant fall in the fifth, sixth and seventh months followed by another increase which remains fairly constant. The fall at the fifth month may arise from a false sense of ability after having achieved a satisfactory level resulting in lack of care. The lower conception rate may then have the effect of drawing the operator's attention to his own shortcomings so that more care is taken, followed by a further rise to a satisfactory level which by now is maintained with the aid of experience. It would appear that a satisfactory conception rate can be expected from the average inseminator after about seven months of inseminating following his official approval and in this period something in the region of 1,100 cows will be inseminated by him. The time taken to inseminate this number of cows will depend, of course, upon the number of cows inseminated per man per day and the various factors determining this.

Table V

Months of Work after Official Approval

| Number of inseminations per 12 men | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1,785 | 1,932 | 1,912 | 1,843 | 1,960 | 2,045 | 1,907 | 2,106 | 1,726 | 1,977 | 1,978 | 2,340 |
| Per cent. conception ... ... ... | 74·7 | 76·9 | 77·5 | 79·4 | 76·9 | 77·6 | 76·9 | 80·0 | 79·9 | 80·7 | 80·6 | 79·9 |
| Number of inseminations ... ... ... | | 5,629 | | | 5,788 | | | 5,739 | | | 6,295 | |
| Per cent. conception ... ... ... | | 76·4 | | | 78·8 | | | 79·0 | | | 80·4 | |

## 8. Abortion Rate and Calfhood Vaccination

Records were kept during the years 1946–49 with a view to examining variations of the rate of abortion. Table VI shows the information collected over the period and the abortion rate is expressed as a percentage of the total number of calves born as a result of artificial insemination in the areas covered by this Centre.

Table VI

Abortion Rate

| | Calves born | Abortion rate % |
|---|---|---|
| 1946 | | |
| January to March ... | 481 | 6·45 |
| April to June ... ... | 539 | 6·31 |
| July to September ... | 552 | 7·35 |
| October to December ... | 710 | 5·07 |
| Total ... ... | 2,282 | 6·18 |
| 1947 | | |
| January to March ... | 763 | 4·85 |
| April to June ... ... | 838 | 8·12 |
| July to September ... | 1,086 | 3·87 |
| October to December ... | 1,410 | 5·29 |
| Total ... ... | 4,097 | 5·39 |
| 1948 | | |
| January to March ... | 1,550 | 3·94 |
| April to June ... ... | 2,014 | 3·08 |
| July to September ... | 1,493 | 5·56 |
| October to December ... | 2,842 | 2·60 |
| Total ... ... | 7,899 | 3·55 |
| 1949 | | |
| January to March ... | 3,395 | 2·24 |
| April to June ... ... | 4,686 | 2·65 |
| July to September ... | 3,755 | 1·78 |
| October to December ... | 3,926 | 2·27 |
| Total ... ... | 15,762 | 2·26 |

It is quite clear that a considerable fall in the incidence of abortion has occurred, the highest figure being 7·35 in the third quarter of 1946 and the lowest 1·78 in the corresponding quarter of 1949.

The calfhood vaccination scheme was considered to be the most likely cause of the improved abortion position but it should also be remembered that spread of the disease was probably checked by the use of artificial insemination with a

resultant decrease in the use of the communal bull. Graph 2 gives a clear picture of the trend of abortion and the increase in calfhood vaccination.

The figures for calfhood vaccination represent those for the whole of Devon and Cornwall, so that the effect on the area covered by the Centre is only proportionate to this, but it is assumed that the amount of vaccination carried out in the operative area bears relation to that done in the whole of the two counties. Vaccination was commenced in the last quarter of 1944. Heifers go to service at about 20 months of age in the South Devon breed ; abortion, therefore, would occur at about 27 months of age. Assuming that calfhood vaccination occurs at about six months of age, then the abortion, if it is to occur, will take place about 21 months after vaccination. In order to obtain a measure of the effect of S.19 calfhood vaccination, therefore, 21 months were allowed to elapse from the date of the vaccine injection. Thus the effects of vaccinations done in the last quarter of 1944 are plotted on the graph at the third quarter of 1946 and this follows through the figures. Moreover, since the animals vaccinated continue to be part of the herds involved in figures obtained from future years, the effect is cumulative, the vaccinations for one quarter being added to the total number of animals thus treated up to that time. It is admitted that the above assumptions may not be completely acceptable ; it is also admitted that the immunity resulting from calfhood vaccination may not last for five years or more : nevertheless, it can be clearly stated that the abortion rate in the herds served by the Centre has fallen appreciably over a period when S.19 vaccination is becoming increasingly widespread. This fall in the abortion rate seems to be fairly widespread and Clark (1949) reports an appreciable fall over the three years 1945–47 in Somerset ; Stewart (1950) reports an abortion rate at Reading of 2·1 per cent. in 1948. While the general inferences of these figures have been quoted elsewhere (Holt, 1949) it was felt that advantage might result from publication of the detailed facts.

### 9. Seasonal Demand for Insemination

Since the opening of the Centre tne seasonal demand nas been consistent from year to year in that mid-summer and mid-winter are the peak periods, giving spring and autumn calvings, with lower demands for spring and autumn inseminations. Graph 3 (over-leaf) shows this trend clearly and gives an indication of the rate of expansion of the Centre, the diminished rise from 1949 to 1950 showing the beginning of a slower rate of expansion after a period of rapid increase between 1946 and 1948. This rapid increase started after the opening of the Liskeard sub-centre in December, 1946, by which time a good deal of prejudice against A.I. methods in the Dartington area had been removed, helped by the appearance of calves sired by the bulls at the Centre. This led to a sharp rise in the demand for the service at the main centre. This accelerated demand, coupled with the opening of the Liskeard Centre in 1946 where prejudice appeared to be almost non-existent and where consequently the service expanded quickly from the start, led to a period of very rapid growth until the middle of 1949. After this time increase has continued but at a decreasing rate and at present the demand seems to be fairly well stabilised.

### 10. Inseminations per Bull

The increased use which can be made of a bull compared with that of the early days of A.I. work is shown by the following figures :—

Table VII

| Year | Average number of inseminations per bull | | Highest number of total inseminations done from a bull |
|---|---|---|---|
| | First | Total | |
| 1944 ... | 226 | 338 | 1,037 |
| 1945 ... | 556 | 932 | 1,769 |
| 1946 ... | 817 | 1,173 | 1,538 |
| 1947 ... | 1,198 | 1,867 | 3,152 |
| 1948 ... | 1,740 | 2,643 | 4,946 |
| 1949 ... | 2,081 | 3,164 | 6,040 |
| 1950 ... | 2,912 | 4,502 | 6,829 |

The averages in columns two and three are arrived at by including in the calculation all bulls used throughout the year irrespective of the number of inseminations done by any particular bull ; in other words, bulls in full use and those kept for reserve are all included. The increased numbers are due solely to a larger number of available cows and higher dilution rates, each bull having been used once every seven days as far as possible over the period.

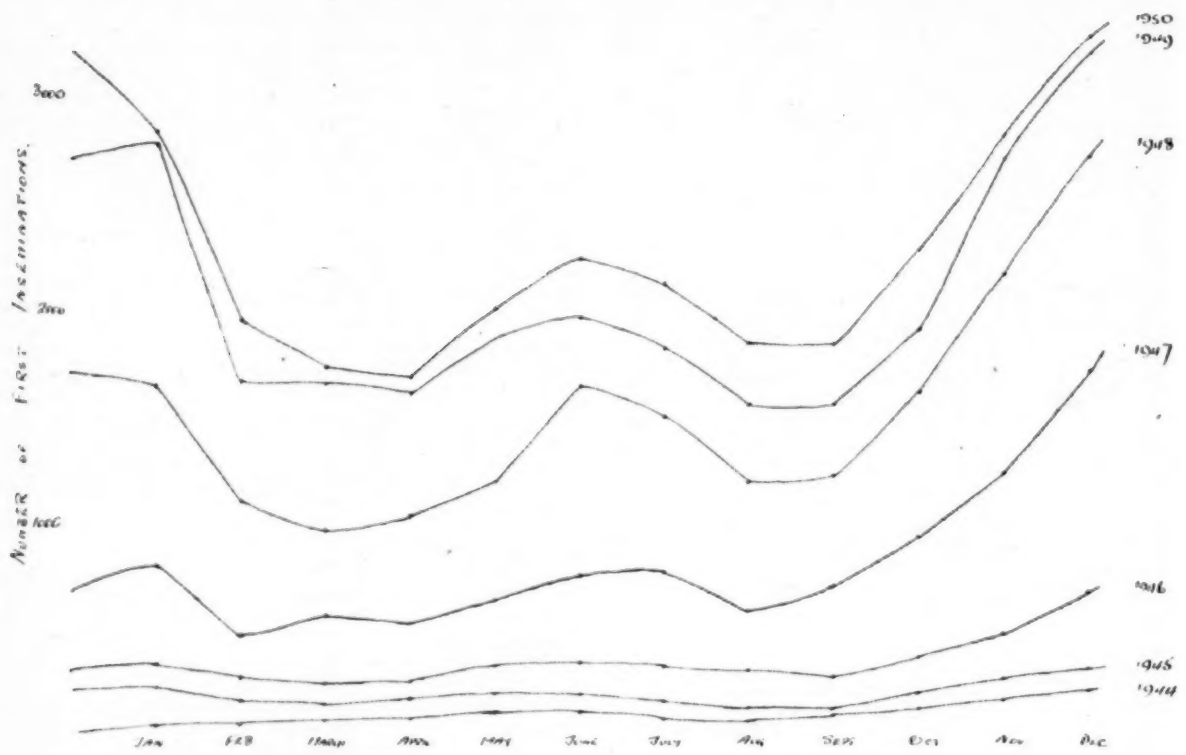
### Summary

Statistical analysis is made of the results obtained in five years' work at a Cattle Breeding Centre.

A conception rate calculated at three weeks can be translated into that for six weeks, nine weeks, three months and the true calving conception. The difference between the three months and calving conception has diminished progressively.

There is no seasonal variation in conception rates nor in the relationship between rates taken at the various periods, but an improvement in conception rate has occurred over the five-year period.

Graph III. Seasonal Demand for Insemination




The difference between conception rate to a first and to a second insemination is appreciably more marked at the main centre than at the sub-centres. There is a greater fall from the three months' figure to the calving figure in the case of second inseminations than to first—this is particularly marked at the main centre.

Study is made of inseminators' conception rates during the first 12 months of the men's work and the various trends are discussed.

The fall in the abortion rate is shown and compared with the increase in S.19 calfhood vaccination.

The seasonal demand for inseminations at the Centre shows that mid-summer and mid-winter are peak periods.

The increase in the number of inseminations per bull is shown over the period 1944–50.

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### Discussion

Mr. G. F. Smith, Beccles, having complimented Mr. Holt on his lucid presentation of such interesting data, said that he wished to admit that although his Centre had been running for as long as Mr. Holt's, so profitable a record system had not been in operation. The essayist was very much more fortunate than many in having his calving record cards returned to him. Mr. Smith was sure that there would be difficulty in his area, and with this thought in mind it had been considered essential to find an alternative method of approach. This had been done through National Milk Records and all expected births were notified to the recorder, who marked each calf. In his own particular Centre a recent survey carried out on calves notified in N.M.R. herds showed that out of 4,355 cows 8·88 per cent. were not in calf or had been sold empty and 0·41 per cent. were in calf to natural service.

He would like to ask if Mr. Holt had found a greater drop between the three-months' conception rate and final calving rate in the winter months of the year. His own observations were that the percentage of returns at more than three months reached its height when cattle went out to grass and then gradually decreased. The fall between the three-weeks' and three-months' conception rate was related to figures already quoted and over the last two years had shown a figure of some 10 per cent. depression, with a more marked fall in winter between the 8th and 12th weeks than at other times of the year.

Variations in unit efficiency were based on conception rates through most artificial insemination centres, although it was difficult to see why this should be so, provided that the technical efficiency of both of the main centres and the sub-centres remained at a high level. He found it hard to explain variations which occurred between the results of sub-centres and main centres, but it would appear that erroneous conclusions could be reached when numbers were small. Main and sub-centre conception rates within the Milk Marketing Board units were now similar. In October, 1950, the conception rate at main centres was 69·7 per cent. on 16,289 cows while sub-centres bred 17,423 cows, at an over-all conception rate of 70.4 per cent., while in November—24,000 and 26,000 cows at main

centres and sub-centres respectively—the conception rates were 69·6 and 70·7 per cent. Although there was close similarity throughout the Board's organisation, there occurred inter-unit variations which often could be associated with changes in technique, variations in herd size and management; the figures being dealt with were small.

It was interesting to hear that Mr. Holt felt that the "calving efficiency" between three weeks and parturition increased with the age of the Centre. This was more than likely to be the case; he believed that on many occasions in the early days of a Centre's activities it was saturated with newcomers who probably were not presenting their cows correctly for service.

Variations in conception rate between first and second inseminations at Beccles showed a difference over some 364 December services of 5 per cent. in favour of the first service.

It had been suggested that the inseminating efficiency of men increased through the first 12 months of their work, but his view was that, provided enough material could be placed at the disposal of trainees during the six to eight week introductory period, maximum efficiency should be reached at six months at the latest, but there were exceptions who required much longer training.

The relationship between a vigorous vaccination programme and a decreased abortion rate was obvious, and while on the whole in the eastern counties the numbers of herds co-operating was considerable, there were lapses which did lead to unfortunate breakdowns. In 4,355 N.M.R. calvings in 1950 there was an abortion rate of some 2 per cent. The demand for service through the Board's Centres varied with the agricultural structure of the area supplied. In broad outline, the East Midlands and eastern counties had a single winter peak, while in the extreme west, Carmarthen experienced a summer grass peak and other units invariably showed both a winter as well as a spring increase. Taking all Board Centres together, the balance was weighted in favour of the winter breeding programme, and 80,300 services were carried out in January and 50,747 in May. It would be of interest to see if winter milk areas continued to show the exaggerated December and January peak with the increase in overhead costs associated with this type of production.

He felt that Mr. Holt had an advantage in calculating services per bull, because South Devon cattle were in the great majority in his area and the maximum use could be made of the stud of bulls; a further advantage in this region lay in the fact that the Dartington Centre had a reasonably even demand over the year. To average almost 3,000 new services per bull over the year 1950 was a very creditable performance, and while this could be equalled with individual sires at the Board's Centres, the average would not compare favourably. At Beccles during the last year the number of services per animal increased by 120 to 1,079 and at other Board Centres where the demand was less seasonal, the numbers averaged 1,500 per bull.

Mr. A. R. Campbell, Inchinnan, congratulated Mr. Holt and thanked him for the signal service he had done the Society by producing a paper with a wealth of recorded information—thereby helping to bring some of the effects and results of insemination from the realm of conjecture to that of fact.

A word of praise must also be awarded for the foresight that had made the presentation of these statistics possible: that shown in the early years of insemination in this country in establishing a recording system from which such information could be extracted. He felt sure that there were few veterinary officers in charge of centres who could produce similar data. Unfortunately, this might put a curb on the discussion and he had to admit that lack of material to back his opinions made him hesitant to substantiate or contradict much of what Mr. Holt had put before them.

To him, one of the most interesting and valuable tables presented was that showing the true conception rate based on calving records, and it was a great pity that the time lag prevented this being substituted for the present-day three-months' conception rate. As had been demonstrated, short-term conception rates were invaluable for the running of a centre, but as between centres or for presentation to the public they could be misleading. It was very easy to imagine a situation where one centre was compared unfavourably with another on their three-months' conception rates and yet the apparently poorer centre might, because of either local conditions or more accurate record-keeping, have the better calving rate; also, it was very difficult to dispel the idea amongst farmers that conception rates and percentages of cows calving to the first insemination were not the same.

It was not made clear exactly how the calving rate had been arrived at; for instance, how did Mr. Holt designate cows which had died or been sold before calving? In the estimation of a calving rate, cows about which there was no definite information might cause a difficulty, *e.g.*, in the West of Scotland where a large trade was done in the sale of in-calf heifers, the percentage of inseminated animals which were sold presumed in calf, could be very high, with the result that the calving rate, as determined by authenticated pregnancies, might be fairly low, yet the possible calving rate satisfactory. It would be interesting to know how those animals about which there was no definite information had been dealt with, as the manner in which they were accounted for must affect the true conception rate.

When discussing the yearly variations of relationship of conception rates taken at different times, the improvement on the three-week conception rate over the years 1944-48 was attributed to greater technical efficiency. No doubt the improvement in greater part might be due to this, but was it not influenced to some extent by the farmers who, becoming more familiar with the method of breeding, used the service more intelligently? It was often the unco-operative farmer, who obtained poor results, who was the first to become disgruntled and ceased to make use of a Centre. The proportion of such members decreased as insemination became established in an area; also the decreasing difference between the three-month conception rate and calving rate had been explained as being due to fewer cows being sold or served naturally after their first insemination. This was the obvious reason.

It was gratifying to see evidence, as provided in Table II, that seasonal infertility did not exist, at least in South Devon. "Wait till your cows go to grass and 'Doctor Green' will settle them" used to be the recommendation, but lately "Doctor Green" had fallen into poor repute, especially if he came dressed in a new ley. Examination of three-month conception rates would show the winter time to be the best season for conception, but this was only a delusion due to divergence of the three-month conception rate and the calving rate. It might be a good thing if similar figures from other Centres could be produced to substantiate Mr. Holt's findings, if only to provide some of our theorists in herd fertility with food for thought.

The increasing difference between first and second inseminations presented an intriguing problem. It might be associated with increasing efficiency and if there were figures available for the percentage of cows calving to all inseminations they might throw some light on the matter. It would be interesting to know if the trend had continued over the subsequent years and perhaps some further data were available.

In general, he agreed that inseminators did not reach maximum efficiency until some months after they had been in the field; strangely enough, however, his performed for the first two months after approval at high efficiency, thereafter subsiding for a period, and he suspected the explanation offered—over-confidence. Their efficiency immediately after approval might be due to the exceptionally good facilities available for intensive training, each man having access to hundreds of cows in the numerous slaughterhouses around Glasgow.

During the period December, 1949, to February, 1950, 675 reported calvings at Southbar Cattle Breeding Centre showed 36 abortions, giving an abortion percentage of 5·3. The figures were, perhaps, too small to support any deductions, but if significant, indicated either that advantage of vaccination with Strain 19 had not been taken to the same extent in the West of Scotland, or that there was some factor or factors present causing a greater proportion of abortions that S.19 could not prevent.

In so far as could be judged from the short time that the Southbar Cattle Breeding Centre had been operating, the seasonal demand in the counties around Glasgow was much the same as in South Devon and Cornwall, showing definite winter and summer peaks, but sub-centres operating in Arran and in the Kintyre Peninsula, which were predominantly summer-mating areas, showed 50 per cent. of the cows inseminated during May, June and July, with the other 50 per cent. distributed fairly evenly over the remaining nine months. It was possible that the increasing high cost of feeding-stuffs might cause a swing over to summer-mating in many areas.

The figures in Table VII were very commendable from a technical and commercial point of view, but was it not high time we stopped to consider the effect of such extensive use of a few bulls? If such bulls were proven, then only good was likely to accrue, but if, as he feared, many bulls of undetermined quality were being used in the same way, then the effect might be such as to bring discredit upon the whole A.I. movement.

Mr. J. P. Frappell, Gloucester, said that he was interested in seasonal variations in conception rate, and stated that apparently there was a better conception rate during the early winter months at Gloucester; what was the factor involved? The greatest proportion of maiden heifers was presented for service in the autumn because of the winter milk programme. These heifers were less likely to be affected with disease or genital abnormalities; therefore one might expect a higher conception rate. Was that the explanation? A survey made on cows turning at the interval greater than three months showed that, of the cows inseminated in the winter

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and therefore turning in early spring or early summer, approximately 90 per cent. held to the first service after that interval, while of cows first inseminated in the spring and early summer and presented again for service during late summer, only 50 per cent. held to the repeat service. This tended to indicate that cows turning after winter inseminations did so because of changes in the environment, such as turning out to grass, increased hours of daylight, etc., while cows returning from spring inseminations did so as a result of conditions more directly connected with the breeding organs and disease factors, and thus were less likely to respond favourably to seasonal changes in management.

Mr. I. G. Shaw, Wolverhampton, expressed interest in the facts given concerning the conception rates of newly trained inseminators. He thought that parallel instances occurred when pilots were newly trained. At first their competence increased rapidly, to be followed by a span where it dwindled due to over-confidence; later, after a period of readjustment, the efficiency reached a level typical of a particular pilot. The whole idea raised in his mind fundamental psychological phenomena. He asked Mr. Holt if the efficiency of lay inseminators increased when they were worked at a comfortable maximum rather than spasmodically. Again, he wondered whether lay inseminators with large hands and arms had a lower conception rate than others.

The speaker wondered how much damage to the cow was inflicted by the act of insemination. He realised that the number of cows affected was not large, but the possibility should not be discounted, as it was attention to detail in work of this nature that was so important. The types of damage that he had in mind were, firstly, the excessive dilation of the anus by the operator's arm leading to cicatrisation and subsequent contraction of the anal ring. It was very noticeable that in some herds with a poor breeding history it was difficult, or even impossible, to carry out rectal examination on account of the marked contraction of the anus. Secondly, damage to the genital organs by the inseminator's pipette. This affected the cervix by damage to the mucous membrane when passing the pipette. The epithelium was breached or bruised, or both, producing a local haemorrhage or extensive petechiation. In addition to this, it was little realised how frequently the endometrium was injured by the pipette being introduced into the body of the uterus.

Regarding the facts given in respect of vaccination by S.19, could Mr. Holt say whether the animals in question were vaccinated in calfhood or as bulling heifers, and secondly, was he able to state the stage of gestation when the abortions occurred?

Finally, could figures be given for the respective conception rates of heifers and cows?

Mr. J. G. Wilson, Starcross, asked if the progressive decrease in the difference between the 12-week estimation and the calving conception rate figures could be due to a decrease in the number of unrecognised abortions reported to the Centre as returns to service. The curve for this decrease would appear to follow that for the recognised abortion rate as given by Mr. Holt.

With reference to Mr. I. G. Shaw's remarks on damage caused by artificial insemination, in his experience in herds where a "herd" non-specific endometritis was present, the act of insemination apparently could cause a flare-up of the endometritis with a discharge in cows in which the latter had been previously cleared up by treatment and in members of the herd which had not previously shown symptoms of endometritis.

Mr. D. L. Stewart, Reading, stated that whereas previously the conception rates obtained by individual inseminators had tended to group round the average of their Centre, recently a marked difference in the results obtained by some individual inseminators had become apparent. Was this an uncommon experience? This suggested another problem, which was the difficulty of keeping inseminators working continually at a high level of efficiency in employment that tended to be of a routine nature.

Mr. J. Smith, Writtle, wished to make an observation to confirm the fact that psychological factors could depress the conception rate of inseminators.

On two occasions inseminators temporarily transferred from centres in the East and South of England to South Wales for periods of three months and over, had very low conception rates during their transfer period. Their conception rates dropped to as low as 25 per cent. from a former figure of 60 to 65 per cent., which figures were again obtained by the men on their return to their home ground. Considerable depression in conception rate was also noted in inseminators transferred from South Wales to the East Midlands and East Anglia. These facts confirmed the existence of psychological factors, such as home sickness, depressing conception rates.

Mr. D. M. Thomson, Ruthin: Mr. I. G. Shaw had raised the possibility of inseminators damaging cows, and he would like more information on what particular damage he visualised. He remembered that in his early days as a sterility officer he learned the technique of intra-uterine irrigation on a large number of cows in slaughterhouses and found that it was easy to put too much fluid into the uterus and consequently cause a rupture and that it was easy to push a catheter through the wall of the uterus, but he was surprised at the difficulty experienced in recognising the damage at *post-mortem* examinations made shortly afterwards. In his early work on insemination he pushed the pipette through the wall of the uterus and as a result of his previous experience did not worry much, but merely withdrew the pipette a little and carried on with the insemination. These cows were checked up and conceived with no apparent difficulty.

Mr. I. G. Shaw, in reply to Mr. Thomson's remarks, said that the question of rupturing the uterus did not arise as the amount of material injected by the act of insemination was very small. Penetration of the uterine wall or damage to the endometrium could occur more easily than was imagined. To assume that where damage was known to have been inflicted accidentally, the cow showed no clinical symptoms of such and conceived, could not be accepted as an excuse for damage to be allowed to take place, nor as an argument that no harm was done to the animal. Cases were well known to the speaker where lesions, resulting either from damage or pathological causes, had been found on examination *post-mortem* which were not detectable by any clinical symptoms shown or by a thorough clinical examination carried out on the live animal.

Inseminators frequently were not able to pass the pipette through the cervical canal and in their efforts to do so carried out prolonged furtive manipulations, extensively damaging the cervix. This was mainly in heifers and the conception rate in such cases was lower. Some inseminators, seeing that no progress was being made, inseminated vaginally and advised the farmer.

Mr. P. G. Hignett, Frant: Having listened with considerable interest to the discussion about psychological and other factors causing individual inseminators to achieve lowered conception rates, he would like to ask Mr. Holt, or indeed any other member present, if they had any opinion as to why these lowered conception rates were achieved? What did the good inseminator do that the poorer inseminator did not? He could hardly believe that it was merely a matter of a difference in the site of deposition of the semen.

## The Reply

Mr. A. F. Holt, in reply to the question whether there was a seasonal variation in the correlation between the three-months and calving conception rate, said that as stated in the paper, no variation of statistical significance occurred in the figures.

On the matter of training of inseminators, he entirely agreed that the time factor had little significance, the important factor being the number of animals inseminated by an individual.

In answer to Mr. Campbell's query on the calving rate, the animals for which no information was available were classified thus: In the case of animals which died, information was given by the farmers on whether or not the animals were assumed to be in calf at the time of death. If so, these animals were classified as pregnant. If not, they were entered as having returned. In the case of animals sold before calving, calf cards were sent to the new owners and the required information thus was obtained. In the few cases where no information could be found, animals having had only one insemination were assumed to be in calf; those having had more than one were assumed to be barren.

He agreed with Mr. J. G. Wilson's suggestion that the diminishing difference between the three-months and calving conception rates to a first insemination might possibly be due to an increase in unrecognisable abortions. He could give no information on the age of animals vaccinated under the calfhood vaccination scheme, but although figures were not available, the majority occurred between seven and seven and a half months; in fact, no cow reported by the owner to have aborted was included in the data.

Inseminators were chosen by interview when a general impression was gained and little attention given to the size of hands and arms, as suggested by Mr. Shaw. He agreed with Mr. Stewart that inseminators tended to group round the average of their Centre, and in most cases there was little variation. He would suggest that the exhibition of monthly conception rates of inseminators on a graph would give rise to a healthy competitive spirit. In reply to Mr. Hignett's question, he knew of no specific reason why there should be variations in the conception rate of inseminators, but the psychological element certainly had a bearing on this problem; therefore an inseminator with domestic and other worries often had a lower conception rate than his average—ill-health likewise caused a fall in conception rate.

## CLINICAL COMMUNICATION

# I. COMMON CAUSES OF AGALACTIA IN THE SOW
# II. FOOT-ROT IN PIGS

ALEXANDER H. HOGG,
Blackburn

## 1. COMMON CAUSES OF AGALACTIA IN THE SOW

### Introduction

In recent years attention commonly has been requested for the sow which has " only just farrowed and has no milk " or which " has farrowed a day and the milk is going back." At one time I was under the impression that in the absence of a febrile condition there was only one cause for a newly farrowed sow having no milk, and that the remedy was simply to inject pituitrin. Subsequent experience, however, suggests that the syndrome is common to perhaps six separate complaints, the most prominent " symptom " in every case being the total absence or lack of milk. I do not propose to deal with the more obvious causes of agalactia, some of which —such as acute specific fevers, acute and chronic mastitis— are common to all species, but with the less obvious and apparently more common conditions. Each will be considered separately and in the order of their frequency of occurrence.

A considerable degree of confusion appears to exist in respect of these various syndromes. With the exception of post-parturient fever, I find the literature rather vague on certain points and one is left with the feeling that the description does not tally with what is found. I refer especially to agalactia, milk fever and eclampsia. I shall therefore describe each complaint as seen and then discuss its features.

(i) *Agalactia per se.*—This seems to be one of those conditions which are familiar enough to practitioners but lack recognition in the literature. It is doubtful if anything strictly comparable is encountered in the other domestic animals : if it does occur it must be but rarely. I have seen odd cases of a somewhat similar nature in heifers, not to be confused with ordinary " hard " milkers, *i.e.*, animals which for a variety of reasons fail to let down milk. In the sow, however, the condition appears to be widespread, and is seen most often in gilts or second litter sows. The degree to which it is present varies. In the majority of cases it is impossible to draw any milk whatsoever either prior to or immediately following farrowing. In other cases the milk supply is scanty or it may last only a very short period, *e.g.*, several hours. As far as it is possible to judge the sows are in perfect health and there are no symptoms of any description other than the failure in respect of the milk. If this is complete, then it is noticed immediately but in other cases where some milk is present there may be delay in notification. Moreover, in both types the litter during the first day is normal and active. Differential diagnosis is, of course, of critical importance in all conditions producing agalactia and fortunately the treatment applied can to some extent provide one method of making a diagnosis. This consists in the injection of 5 c.c. pituitrin. In a successful case the milk flow is established immediately and lasts indefinitely. I have found, however, that such a result is far from common and it is obtained most often in gilts with complete or total agalactia. In a great number of others, especially those in which the supply is scanty or of short duration, pituitrin injection results merely in a brief and limited improvement. This improvement may be maintained for only a matter of minutes or may last for several hours, repeated injections at variable intervals having no better results. The remarkable success of pituitrin, on occasion, not unnaturally suggests that a hormonal failure or upset is the predominant feature of the complaint.

As against this, however, milk flow of short duration *only* has been produced by :—

1. The subcutaneous insertion of a needle alone.
2. The serial injection every 10 minutes into the same sow of (1) pituitrin, (2) carbamylcholine, (3) Ca borogluconate, (4) penicillin. The already existing slight flow was augmented after each injection but fell back to its original rate in three to four minutes.
3. Flushing out the vagina with a warm antiseptic solution.
4. Merely introducing the arm into the uterus.

As far as I am concerned, therefore, the treatment of pure agalactia is at present very unsatisfactory. The above would seem to suggest that if the case is one which will respond successfully to pituitrin, then probably calcium (for instance) would work as well and indeed needle insertion alone might suffice. Alternatively, if the case is a pituitrin failure then I know of no drug or procedure which will better its admittedly limited effect. It will be noticed that I have included two types of case under the heading of pure agalactia, namely (i) the sow with no milk whatsoever, and (2) the sow giving insufficient milk of brief duration. I believe that both types are examples of the same condition, since a successful result may be achieved in either type with identical treatment.

The problem of milk release in normal lactating pigs has been investigated by Braude and Mitchell (1950), especially in regard to the (oxytocic) effect of pituitrin. The authors stress that the sow has a very strong control over milk release and that pituitrin injection is necessary to overcome it for hand milking. If the condition is purely one of hormonal failure or insufficiency and, moreover, pituitrin can be assumed to contend with this, then why such miraculous success in some cases and not in others ? How can an intramuscular injection produce such a dramatic effect in so short a space of time ? Then again, if it is merely an effective nerve stimulus which is required, needle sticking should suffice in every case. This, however, is not so. Must we, therefore, presume that the syndrome is common to a number of conditions or, alternatively, is it the question of release initiation which is complex ? I believe that these cases can be classed as showing only a failure in the milk release mechanism and that it is not a question of the absence of milk or the inability of the piglets to draw it.

(2) *Post-parturient Fever.*—Published work on this disease is incomplete, and its importance is greatly underestimated. It appears to be widespread and occurs commonly in this district. When it becomes established in a piggery it can be a serious business. Clinically it resembles in many respects the so-called *B. haemolytic streptococcus* syndrome in bitches. I refer solely, however, to those aspects of that disease which are manifested in the whelping animal. This, indeed, is the only aspect of that condition which I am prepared to accept clinically as being a distinct entity. As in the bitch, the sow shows no signs of the condition until immediately following farrowing. The symptoms include inappetence, agalactia, and some degree of pyrexia. Often the latter is only slight. The pressing problem, of course, is the failure of the milk supply. There is generally some milk present but not sufficient to maintain the litter, which deteriorates quickly. An abnormal vaginal (uterine) discharge may be present after the second or third day but this is generally slight and I do not believe that any marked degree of metritis will be found in most cases. The discharge eventually resembles chronic " whites " as seen in the cow. Some degree of mastitis may

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also supervene but is not a constant feature. Most sows are in little danger, especially if penicillin or sulphonamide treatment is given promptly. The fate of the litter, however, hangs in the balance during this period and if the milk supply is not increased quickly through treatment a large loss will be incurred. Bottle feeding will naturally tide them over this period but this is laborious and applicable only to small pig keepers. The disease appears to spread insidiously but this can be observed only in the larger piggeries. There is a strong possibility of venereal spread. I am not suggesting that this is the main method of transmission, for there are ample possibilities in other directions. In one piggery it was eliminated only by disposing of the entire stock of breeding animals, boars included. This was followed by thorough disinfection and the introduction of completely new stock. In less pressing cases it can be controlled to a large extent with sulphonamide dosing prior to and for two days following farrowing. The more active members of the series appear to be necessary and I have had no success with sulphanilamide itself. Further, I do not credit either sulphatriad or penicillin itself with any spectacular success in the *treatment* of the condition. This finding corresponds with our results in the treatment of the B.H.S. syndrome in whelping bitches. I am not implying, however, that post-parturient fever is a streptococcal infection. On the contrary, I merely wish to point out that, in my experience, response to treatment does not compare with that seen in other pig diseases, *e.g.*, erysipelas. Should the condition be of bacterial origin, the organism appears to be somewhat resistant to penicillin or the sulphonamides. Power (1950), using sulphapyridine orally or solupyridine parenterally, reports better success than I have achieved, He also advises, in addition, 3 to 6 c.c. of pituitrin. The results I have observed with this latter drug in cases of post-parturient fever have been similar to those already mentioned in respect of pure agalactia and classed as pituitrin failures. To be fair, however, my judgment of pituitrin in post-parturient fever has been only in respect of milk increase and takes no consideration of any other beneficial effects which might result from its use. Also, whilst I am far from satisfied with the treatment as it stands, I know of none better than that which Power suggests, which is identical with mine. The possibility of a vaccine to control the condition when it gets out of hand appears worthy of consideration. It has been suggested that the disease may be a form of erysipelas but there now seems sufficient evidence to suggest that the condition exists as a separate and definite entity, having no connection with erysipelas or the non-specific febrile diseases to which the farrowing sow is subject, *e.g.*, acute metritis, acute mastitis, etc. I suggest that in single cases of post-parturient fever the main points of differentiation are : (1) it is often more of a subacute character, especially in the appearance of the symptoms ; (2) often the temperature is raised only 2 or 3 degrees ; (3) the vaginal discharge is generally mucoid and of the "whites" variety (in contradistinction to the blood-stained brown discharge of acute metritis) ; (4) the mastitis is generally subacute in character (Power mentions that the posterior part of the udder becomes indurated, with resulting agalactia) and distinct from the blue black variety of acute staphylococcal type associated with newly farrowed sows ; (5) a degree of agalactia is always present but is generally not complete, as it is in acute mastitis or metritis.

(3) *Chilling.*—Chilling arising from the combined effect of bad housing and inclement weather is particularly prevalent during the winter months. It is surprising how often sows which have borne draughty cold premises during pregnancy have immediately manifested their inability to withstand this environment at farrowing. Symptoms shown have been those of inappetence, listlessness and disregard for the litter, subnormal temperature and agalactia. The treatment consists solely in raising the temperature of the premises by the use of wooden boards, sacking, lamps, etc. Immediate improvement generally is obtained by these simple measures and no medicinal treatment is necessary. The opinions of the Stormont workers in this regard have been proved to the hilt in this district during the early months of 1951 when penetrating east winds and a rush of amateur pig keepers combined to produce premises totally unsuitable for farrowing sows.

(4) *Agalactia of Unknown Causation.*—I have observed several cases where the milk supply has failed at varying intervals, *e.g.*, a fortnight, following farrowing. In these cases, however, the supply, in contradistinction to all types of agalactia previously mentioned, does not diminish equally in all the breasts but affects a certain number only. Further, there does not appear to be any evenness in the distribution of the affected teats : there may be one on one side and three on the other. The affected gland appears to atrophy and dry off, the secretion maintaining its normal appearance. Needless to say, the piglets on the affected teats wither away as the milk fails. Clinically the condition is not one of mastitis, contrary to what might at first be suspected. No change takes place in the affected glands other than atrophy and what secretion there is remains apparently normal. As far as can be judged, the decline of the piglets on the affected breasts is due solely to starvation. If further proof were needed it is provided by the fact that the condition can either remain stationary for the remainder of the lactation, or resolve itself in a matter of days without any treatment whatsoever and at subsequent farrowings the breasts milk evenly. I have attempted various treatments, *e.g.*, penicillin, pituitrin, calcium, etc., but with no success. Perhaps the most remarkable feature of the complaint is the tremendous disparity between the piglets on the affected and non-affected breasts. I have no opinion on the cause of this complaint, but pigmen attribute it to inclement weather.

(5) *Other Causes.*—I should like to mention, very briefly, some other supposed causes of agalactia. The first of these is lack of exercise during pregnancy. Rather unexpectedly I have heard this suggestion mooted more often in respect of gilts which have been rather favoured, inasmuch as they may be farrowing at an age which errs on the right side and have been well provided for both in respect of food and luxurious quarters. One would have suspected that lack of exercise, etc., might more easily have been cited as a cause of agalactia in large overfat sows. I prescribe a condiment mixture for such cases, but coarse desiccated thyroid powder might produce good effects. Pig keepers who use mineral mixtures believe that they tend to increase milk supply and have a preventative action against anaemic scours. I can see the point in such an argument if the sows were undernourished or the diet badly balanced, but the use of such mixtures seems to be called for amongst a class of stock where dietary insufficiency or imbalance is not easily apparent. If the stock owners are correct in their beliefs it would suggest that the diet of pregnant sows requires considerable attention. Anthony (1950) stresses this point, but more especially perhaps in regard to the effects on the litter. Thus he points out that the minerals most likely to be deficient are iron, copper, calcium, magnesium, phosphorus and iodine, and that young pigs with mineral deficiency will show positive signs of failure to thrive. He also suggests points which I have already mentioned and which are more pertinent to the main point at issue, namely, the milk supply of the sow. Thus he says

that small litters of weak piglets which do not thrive are often due to excessive fatness in the sow and too close confinement during pregnancy. I should be interested to learn which is considered the more important in such sows, namely, paucity of milk or quality.

(6) *Milk Fever and Lactation Tetany.*—I have no experience whatsoever of milk fever in sows if by this is meant a condition simulating the disease in cows. Quite frankly, I am surprised at this for the literature would lead one to suppose that it is not uncommon. I have seen an odd case or so of suspected lactation tetany, *i.e.*, a condition resembling this disease in bitches. They occurred in sows six to eight weeks farrowed where the piglets were doing well whereas the sow was in only medium condition. The symptoms were those of nervous instability and cure was obtained by weaning the litter and using sedatives. Calcium therapy was not used. In the literature cases of so-called lactation tetany during the first week following farrowing are described and reference is made to the close similarity to the disease in bitches. I cannot agree with this latter suggestion, for in bitches the condition is surely most often seen from three to four weeks onwards following whelping. I may be unlucky in the number of cases of the milk fever-eclampsia type I have seen, but I query, firstly, its commonness and cannot but help remark on the apparent confusion existing in the literature in regard to them. Thus a questioner in *The North American Veterinarian* recently, enquires as to the most satisfactory treatment for eclampsia (milk fever) in the sow, occurring from one to four days after farrowing. He proceeds to describe the symptoms as being a sudden refusal to eat, congested udder, failure to nurse piglets, normal temperature, rapid respiration, restlessness and nervousness. He then says that affected sows often die within a few hours of onset of the condition and that this may happen even following the injection of calcium. Carey (1951), in his answer, says that milk fever or eclampsia does occur and that the symptoms resemble the disease in cows. Calcium cures the complaint. This respondent then says that the symptoms which the questioner describes refer to a condition which he (Carey) sees often, although the rapid respiration is observed chiefly in hot weather. When laboured breathing does occur in cold weather it is a bad sign. The treatment advised includes pituitrin injection. The answer concludes by advising ice packs on the udder in hot weather and intravenous pentobarbital sodium in cases of extreme nervousness. Unfortunately, Carey does not give any name or indication of the cause of this condition. I have mentioned this question and answer because I believe it shows very clearly the difficulty of differentiating between these eclamptic type syndromes and, further, it illustrates the confusion which arises in the literature. I have every sympathy with the questioner in his difficulties, and find the answer both helpful and yet at the same time confusing. The questioner, like myself, must accept the fact of the occurrence of a milk fever syndrome with a normal response to calcium therapy. Evidently, however, neither of us has yet encountered a case. Heat prostration is well known and extreme nervousness in sows, whilst it may occur in association with eclamptic syndromes, is perhaps more likely to be described here as ill temper or viciousness and accorded similar treatment. Power (1950) advises chloral by stomach tube. Therefore I am left with the condition which the questioner mistakenly describes as milk fever but which is familiar to Carey. Does this condition exist in this country and, if so, under what name? What association has it with the condition I have described as pure agalactia? What connection, if any, exists with the odd cases I have seen and labelled lactation tetany occurring in sows six to eight weeks farrowed? I feel sure most practitioners will agree when I say that a little sorting out in connection with these agalactia syndromes would be helpful for all concerned.

Finally, I find that since the above was written there have been reports from Irish veterinarians of the use of Pregnyl (Organon Laboratories) in agalactia. I myself have no experience of this drug (anterior pituitary-like gonadotrophic hormone), but its use for this purpose is not, of course, new and it may be that its rediscovery will show it to have a place in the treatment of some of the above-mentioned syndromes. I shall certainly await further reports with interest.

## 2. FOOT-ROT IN PIGS

This complaint appears to be fairly common and whilst normally it is of little moment it can become an extremely acute and highly infectious disease. Normally it takes the form of a subacute to chronic condition which is generally neglected or even goes unnoticed by the pig owner. Several pigs or perhaps only a single animal may be affected on one farm. Such animals are probably dangerous inasmuch as they may act as carriers of the disease. This is especially so if the boar is affected and widely used in the district, as so often happens.

In a *chronic* case great deformity of the sole takes place and complete clinical cure is difficult if not impossible. Walking is painful in such cases and boars serve only with difficulty. In this respect it resembles overgrown feet in under-exercised bulls. The resemblance, however, ends at that point. The *subacute* type appears to cause little if any discomfort. The *acute* disease closely simulates foul or "bush" in cattle and foot-rot in sheep, but has certain points in which it differs from both these conditions.

The disease commences on the sole proper, generally in the central area of one cleat. On occasion, however, both cleats may be affected simultaneously. Erosion of the sole takes place at the affected point, quickly followed by a great deal of granulation tissue which protrudes through the diseased sole. The disease may become limited at this stage and no further extension of the infection takes place. The proud tissue shrivels or keratinises and the gap in the sole is sealed. The seal, however, remains rough and uneven and great deformity of the sole may be produced. There appears to be no tendency for the disease to "track" upwards via the wall, as is seen in foot-rot in sheep. In fact, these subacute to chronic cases much more closely resemble neglected canker in horses.

It would appear from the case described below that on occasion the disease may assume a more virulent form and will spread with rapidity through a piggery. Trouble began following the introduction of two in-pig sows, both of which were found to be affected soon after arrival. Nothing much was done regarding these animals but shortly afterwards, when it was discovered that several other sows were becoming affected, veterinary advice was sought. The disease spread quickly and at least a dozen sows eventually were affected. The condition began as already described, but instead of regressing after the stage of sole penetration the infection invaded the deeper structures of the foot and a typical condition of "bush" resulted. In cases which were not controlled at this stage bursting at the coronet was observed as in quittor. The prominent symptom was an acute lameness, but since several of the animals, which were all big heavy in-pig sows, were close on farrowing they promptly went off their legs. Most animals had more than one foot affected although generally only one foot reached the "bush" stage. Those sows which became recumbent made very heavy weather of the disease, refusing their food and spending a

large part of the day puffing and panting for long intervals. In two animals the condition appeared extremely serious and caused much misgiving before final recovery. In fact, in the more serious cases death would not have been altogether unexpected.

The results of treatment were not spectacular, although eventually a cure was obtained in all cases. In the mildest cases dipping the feet in copper sulphate solution, combined with the alternate application of a foot-rot and a sulphonamide ointment, cleared up the condition in a week to 10 days. If caustic preparations are not employed control of granulations is difficult. In the more acute cases sulphamezathine was injected but the results were not comparable with those observed in "bush" or foul in cattle. In the sows which were close to farrowing and off their legs penicillin was given in addition and both drugs were repeated daily. The entire premises were swilled daily with weak copper sulphate solution and the disease eventually died away.

Finally, I have recently seen a further variation in a boar. This animal had suffered from a chronic infection of its feet for some time. The forefeet were the worst affected. The condition suddenly flared up and one of the forefeet had the appearance of a very mild "bush" when first seen. Both front legs, however, were slightly swollen all the way up. This swelling appeared to be largely due to a hard oedematous condition of the skin on the external aspect of the limbs. This extended upwards over the shoulders and was most marked over the scapular region where it took the form of a well-defined hard plaque, apparently an inch or two in thickness. Treatment took the form of sulphamezathine by injection combined with hot fomentations to the legs. The swellings subsided rapidly and recovery took place.

*Typical chronic condition in a boar in which all four feet were affected.*


References

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Weekly Wisdom

*Medicine was an art and would never, while human beings were individual identities, be an exact science. An art could never be organised from a central office without cramping it and making mediocrities of its exponents.*—Dr. W. Jones (Liverpool) addressing the Fellowship for Freedom in Medicine.

## ABSTRACTS

### Bacterial Breakdown of Starches in the Digestive Tract *

Digestion of raw starch granules depends upon the structure of the granule and the anatomy of the alimentary tract, for the latter determines the site of bacterial activity. Maize starch was digested mostly in the small intestines of rats, mice, rabbits, guinea-pigs and pigs; raw potato starch, however, accumulated in the caecum in large quantities and was there attacked by bacteria. A similar result was obtained after feeding the two types of starch to a man with pelvic colostomy. Both raw potato and maize starch grains were attacked by bacteria in the rumen of sheep and oxen but disintegration in the latter was the more rapid. In sheep very few maize starch granules reached the ileum whereas numerous raw potato starch granules reached the ileum and caecum four hours after feeding.

Boiling or grinding potato starch rendered it digestible in the small intestines of rats. Experiments with Canna or Maranta starch granules, which are similar in structure to potato starch granules, showed that they behaved in the same way, while tapioca and starch granules, which are similar to maize starch in structure, are digested chiefly in the small intestine.

Bacteria associated with breakdown of starch include organisms giving an "iodophilic" reaction to iodine, indicating the synthesis of bacterial polysaccharide. Species variation of the host was noted in relation to the intensity of the colour produced and among non-ruminants it was greatest in the pig. Small, large and giant streptococci and giant sarcinae were predominant forms in the rumen. In the caecum of the pig, short chains of rod-shaped organisms, identified as *Clostridium butyricum*, were observed in large numbers. In rats fed potato starch and dosed with succinylsulphathiazole, transition from very small cocci to large sporulating rods was found in a single chain, which suggests that pleomorphic variants of one organism occurred under these conditions.

A cell-free preparation of amylase was obtained from the caecal contents of a pig fed raw potato starch. Similarly, pure cultures of *Clostridium butyricum* were shown to produce amylase. In addition, this organism, when grown in media deficient in the vitamin in question, was found to synthesise nicotinic acid, riboflavin, folic acid and pantothenic acid.

Pigs fed a B-free ration which includes raw potato starch made adequate but sub-normal weight gains. Controls fed boiled potato starch died.

A. T. P.

* **Bacterial Breakdown of Structural Starches and Starch Products in the Digestive Tract of Ruminant and Non-ruminant Mammals.** Baker, F., *et al.* (1950.) *J. Path. Bact.* **62.** 617.

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### Effectiveness of Terramycin in Large and Small Animals *

In exploratory trials terramycin was given to over 100 cases of shipping fever (pasteurellosis) in young cattle and to a few cases of distemper and tonsillitis in dogs. Cattle were treated with 0·5 or 1 gramme intravenously accord-

* **Clinical Studies of the Effectiveness of Terramycin in Large and Small Animals.** Cromley, C. W., & Hagely, J. M. (1951.) *Vet. Med.* **46.** 219-221.

ingly as the animal was under or over 500 lb. in weight. This dose was given once daily for as long as necessary.

Results in shipping fever were very good, even in eight cases already treated without benefit by procaine penicillin and a sulphonamide. Cures were usually obtained in a very few days.

Eight dogs received 250 mg. in capsules once daily and all recovered from distemper, pneumonia or tonsillitis within two to three days.

Baby pig disease in three litters made no response to terramycin.

J. E.

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## Terramycin in Small-animal Practice *

The antibiotic substance terramycin may be administered in capsules, by the topical or ophthalmic application of ointment, or by the intravenous route. In a limited series of small-animal cases the authors used an initial oral dose of 25 to 50 mg. per lb. bodyweight, or by the intravenous route 5 mg. per lb. daily. Dosage was divided into two or three parts, decreasing to one-half by the fourth day. No toxic effects were observed.

Terramycin was effective in the treatment of acute catarrhal conditions of the upper respiratory tract, suppurative otitis media, cystitis, multiple abscess formation and punctured wounds of the dog. It proved ineffective in two cases of canine encephalitis but it may be noteworthy that full response was obtained in six out of nine cats exhibiting symptoms of infectious panleukaemia with diarrhoea, anorexia and dehydration.

J. P.

* **Terramycin in Small-animal Practice.** Pessin and Jordan. (1951.) *N. Amer. Vet.* **32.** 338-340.

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## REVIEW

**[Eugen Fröhner's Lehrbuch der Gerichtlichen Tierheilkunde.** Tenth edition, 1951, by K. Neumann-Kleinpaul and J. Dobberstein. Berlin: Richard Schoetz. Price Dmk. 24.]

In Germany, the vendor, who may make a written or verbal agreement with the purchaser, and may give specific guarantees with regard to the animal in question, is, generally speaking, liable to the purchaser for such diseases or defective conditions as reveal themselves after the sale of an animal, provided that they are of importance (*erheblich*), and that they would not have been apparent to the layman when buying the animal, although they could be shown to have been present then. These diseases or defects are known as the *Vertragsmängel*, and it will be seen that many different conditions may be included under this term. However, in the case of the sale of a horse, ox, sheep or pig, the vendor is liable, automatically and in the absence of any special agreement, to the purchaser if any one of certain specified defects or diseases (the *Hauptmängel*) appears or is diagnosed within a certain limited period (usually 14 days) after the sale, as it is then presumed in law that the condition was present at the time of the sale. This notion of the *Hauptmängel* represents the old "German" law, as opposed to the "Roman" law notion of *Vertragsmängel*, both being incorporated in the German civil code when it came into force in 1900. The list of *Hauptmängel* is short. For the horse, the conditions concerned are: glanders, Dumkoller, broken wind, roaring, periodic ophthalmia, cribbiting; for cattle, tuberculosis and contagious bovine pleuro-pneumonia; for sheep, mange and (in slaughter animals) general oedema; for the pig, swine erysipelas, *Schweineseuche* (including swine fever), and (in slaughter animals) tuberculosis, trichinosis and measles.

In this book, there is considerable discussion of the veterinary aspects of the *Hauptmängel*, and of those conditions that figure most often as *Vertragsmängel*, that are of forensic importance, attention being given, for example, to the practical problems of making a diagnosis and of estimating the probable previous duration of a disease or defect from the nature of the symptoms or lesions present, while much information is given of use to the German veterinary surgeon called in as an expert, and that would be of interest to others with like problems. Other subjects dealt with include the legal responsibilities of the German veterinary surgeon in, for example, prescribing, dispensing and administering drugs, in casting horses, in castration, the legal aspects of faulty shoeing, and the identification in carcases of species and sex.

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### *Salmonella minnesota* Infection

"A large outbreak of food-poisoning caused by *Salmonella minnesota* has occurred in Northamptonshire and the surrounding country," states the *British Medical Journal* in its issue of January 5th, and continues: "Several hundred people have been affected, and a man and a woman have died. The source of infection has been traced to meat pies manufactured at a pie factory in Northamptonshire. In nearly all cases the symptoms are very mild, lasting for about three days. They include headache, nausea, and diarrhoea, and the patient is often left feeling rather depressed. As is usual in such outbreaks, elderly people are more liable to show symptoms of infection than the young. The incubation period is about 18 hours.

"The first case was identified on December 21st, 1951. The source was traced the next day and immediate action taken. No fresh cases are known to be occurring now. The precise origin of the infection in this outbreak is not yet known—that is, how the meat pies came to be infected. They contained meat imported from Denmark, but that cannot necessarily be incriminated, for *Salmonella minnesota* is by no means unknown in Britain. We are grateful to the Salmonella Reference Laboratory, Colindale, for informing us that on December 10th this organism was identified by the laboratory in a specimen obtained from a patient in Northamptonshire.

"In 1951 this laboratory identified the organism in 23 cases before the Northamptonshire outbreak. Most of them came from Inverness and the Aberdeen area. Two fatal cases in Aberdeen were identified in October. The infection was also identified in a case in London in November. In 1950 four human cases were discovered, but no case is known to have occurred in Britain before that.

"*Salmonella minnesota*" was isolated by Dr. B. S. Pomeroy in 1936 from a three-weeks-old turkey poult in Minnesota and its characteristics were first described by Edwards and Bruner (*J. Hyg., Camb.*, 1938, **38.** 716). This is the first large outbreak in Britain known to be caused by this organism."

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The Medical Research Council is to receive about £80,000 to support research on cancer, under the will of Mr. John A. Hopps, of Leicester, a director of F. Hewitt and Son, Ltd., who publish the *Leicester Mercury* and other papers.

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The Minister of Agriculture has appointed Lord Carrington, Parliamentary Secretary to the Ministry of Agriculture, to be Chairman of the Hill Farming Advisory Committee for England, Wales and Northern Ireland.

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All the Shechita communities throughout the country, responsible for the administration and performance of ritual slaughter, have now become affiliated to a central body known as the National Shechita Council. The objects of the Council are to centralise all the information connected with the administration of ritual slaughter and to act as a focal point for any negotiations with the various Ministries connected with the meat industry. The head office of this Council is at 29, Alie Street, London, E.1.—*Meat Trades Journal.*

XUM

MEMOIR

# HENRY WILLIAM (HARRY) STEELE-BODGER, M.R.C.V.S.

## President, N.V.M.A., 1939-1941

It is with profound regret that we record elsewhere in this issue the death of Mr. Harry Steele-Bodger, of Tamworth, whose services to the profession he loved went far beyond the requirements of the successful practice he enjoyed. Although his illness was prolonged and necessitated two major operations since the interruption of a journey north last June which involved his transference to the Queen Elisabeth Hospital in Birmingham, his passing comes as a great shock. Up to that time we saw at the prime of life a man of seemingly inexhaustible energy, devoting himself to the concerns he had at heart with an infectious enthusiasm which evoked not only respect but affection even from those who did not always share his views. His capacity for friendship was unrivalled: he was also, as recently we have been reminded, "a magnificent enemy—splendid in combat."

Born at Peterborough in December, 1896, he graduated at the Royal (Dick) College in 1922. In his boyhood an athlete, he was the first to be awarded "running colours" at Cranleigh School, and during the war ran first in the Army cross-country championship. Too young for the Service in 1914, he joined the Blue Cross Ambulance Corps, and was attached to the French Army under Professor Almy, of Alfort College, here learning to speak French like a native. Later he came home and joined the Royal Engineers as a driver, became a shoeing smith and instructor in shoeing, and then was given a commission in the R.F.A. and was an instructor in horsemastership. Applying for active service he was attached to the Ulster Division in France and wounded and gassed in 1918. On recovery, and while in charge of "rogue" recruit horses at Edinburgh, he was kicked in the face and lost an eye, being reported killed.

The practice acquired by Mr. Steele-Bodger at Tamworth the day after his graduation rapidly became the centre of a wide connection with many branches—its principal aptly described as "the typical modern veterinary surgeon at his best"—keen, up to date and with many special interests such as the study of the problem of infertility in bovines. From 1936 to 1939 he served the Royal College as Examiner in Animal Management, and his work as a Member of Council of that body from his election in 1939 to his retirement last year exemplified his sense of responsibility towards participation in the corporate life of the profession. This was illustrated even more fully, however, by his intensive, yet long sustained, activities on behalf of the National Veterinary Medical Association. It is, indeed, a sad reflection that he has not lived to see the official seal set upon a universal appreciation of the worth of those services, in his election as an Honorary Member of what has now become the British Veterinary Association: the Extraordinary General Meeting of Members to confirm the unanimous recommendation of the Council was due to take place on February 1st next.

After many years as an ardent, well-informed committee man, Mr. Steele-Bodger occupied the Presidential Chair from 1939 to 1941, and it is a tribute to his genius that he transformed a period of potential frustration into one of productive progress. Within a few weeks of his election at Yarmouth war was upon us: immediately, Steele-Bodger set himself the task of ensuring that the services of the profession should be utilised in such a manner as to justify the decision of the Government to place veterinary surgeons in the Schedule of Reserved Occupations. For some years he had been the Hon. Secretary, as he was ultimately the President, of what was then known as the Society of Veterinary Practitioners, and it was at his instance, and that of the Society, that there was brought into being the Survey Committee. It is that Committee's review of the diseases of livestock in this country and its recommendations for their control, primarily envisaged by him as the profession's contribution to the war effort, that will remain as his monument. When this Committee was laid down at the end of 1946, and its functions were transferred to the Technical Development Committee, its members—over whose deliberations he had presided since its inception—supplemented the award to him of the Dalrymple-Champneys Cup and Medal by a presentation, in recognition of his initiative in the formation of the Survey Committee and his subsequent untiring devotion to its aims and participation in its labours. It will ever be remembered as the Committee which introduced the Scheme for the Control of Certain Diseases in Dairy Cattle, which was launched by the Ministry.

A further invaluable service rendered the Association by Mr. Steele-Bodger was his typically immediate and generous reaction to the impossible situation in which London organisations found themselves placed during the war, when, very largely at his own expense, he housed the headquarters at his Lichfield premises.

May their knowledge, not only of universal sympathy, but of the profession's unity in admiration for Mr. Steele-

Bodger's truly herculean and successful labours in promoting the health of the country's livestock and the well-being of its people, sustain Mrs. Steele-Bodger and their two sons —Alasdair and Michael, both members of the profession—in their grievous loss.

## NOTES AND NEWS

### Diary of Events

Jan. 19th.—Meeting of the Biochemical Society, at the Middlesex Hospital Medical School, London, W.1, 10.30 a.m.

Jan. 22nd.—Meeting of the East Midlands Division, B.V.A., at Sutton Bonington, 2.15 p.m.

Jan. 24th.—Meeting of the Western Counties Division, B.V.A., at Exeter (Imperial Hotel), 2 p.m.

Jan. 24th.—Meeting of the South-Eastern Division, B.V.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

Jan. 25th.—Annual General Meeting of the North of Ireland Division, B.V.A., at Belfast (Whitla Medical Institute), 2.15 p.m.

Feb. 1st.—Extraordinary General Meeting of Members of the British Veterinary Association, at the Connaught Rooms, Great Queen Street, London, W.C.2, 4 p.m.

Feb. 8th.—Royal Dick School of Veterinary Studies Annual Ball, in the Assembly Rooms, George Street, Edinburgh.

Feb. 14th.—Glasgow University Veterinary Medical Association Annual Ball, at The Rhul, Sauchiehall Street.

QUARTERLY MEETINGS OF COUNCIL AND COMMITTEES, B.V.A.

*Wednesday, January 30th*, 1952

11.0 a.m. Home Appointments Committee.
2.0 p.m. Organising Committee.
4.0 p.m. Parliamentary and Public Relations Committee.
At 36, Gordon Square, London, W.C.1.

*Thursday, January 31st*, 1952

10.0 a.m. Veterinary State Medicine Committee.
1.30 p.m. General Purposes and Finance Committee.
At 36, Gordon Square, London, W.C.1.

*Friday, February 1st*, 1952

11.0 a.m. Council Meeting.
At the Connaught Rooms, Great Queen Street, W.C.2.

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### R.C.V.S. OBITUARY

HEAD, Alfred Searle, C.M.G., F.R.C.V.S., Lt.-Colonel R.A.V.C., 43, Coinage Hall Street, Helston, Cornwall. Graduated London, December 14th, 1897; Fellowship December 21st, 1908. Died January 9th, 1952.

STEELE-BODGER, Henry William, 28, Lichfield Street, Tamworth, Staffs. Graduated Edinburgh, July 17th, 1922. Died January 11th, 1952, aged 55 years.

VETERINARY PRACTITIONER

LEE, George, 736, Barking Road, Plaistow, London, E.13. Registered November 6th, 1950. Died January 7th, 1952.

### Death of Mr. Harry Steele-Bodger

Both the veterinary and the agricultural communities, whose mutual interest and friendship he did so much to foster, will mourn very deeply the loss of Harry Steele-Bodger, as he was known to all, which took place at his home in Tamworth on Friday of last week, after a lingering illness courageously borne. An editorial memoir appears elsewhere in this issue; it will be succeeded by personal tributes in due course.

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### PERSONAL

*Dr. A. T. Cowie's Research Fellowship.*—Dr. A. T. Cowie, B.SC., M.R.C.V.S., of the National Institute for Research in Dairying, Shinfield, Nr. Reading, has been awarded a Research Fellowship from Harvard University, together with a Travel Grant from the Rockefeller Foundation. He will thus be enabled to spend a year in the Laboratory for Surgical Research of the Harvard Medical School in Boston.

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### ROYAL SANITARY INSTITUTE CONGRESS, 1952

As already announced, the annual Health Congress of the Institute will take place at Margate from April 22nd to 25th, under the presidency of the Rt. Hon. Lord Moran, M.C., M.D., F.R.C.P.

The President of Section D (Veterinary Hygiene) is Sir Thomas Dalling, M.A., D.SC., F.R.C.V.S., F.R.S.E., Chief Veterinary Officer, Ministry of Agriculture and Fisheries, the Recording Secretary being Mr. W. Brennan De Vine, M.C., F.R.C.V.S., D.V.S.M. The Section will meet from 2.30 p.m. to 5 p.m. on Tuesday, April 22nd, when the President's address will be succeeded by the following papers: "The Production and Distribution of Milk: a Possibility for the Future," by Harold Burrow, M.R.C.V.S., D.V.S.M., Professor of Veterinary Medicine, Royal Veterinary College; "The Hygienic Preparation of Meat Carcases," by Mr. H. E. Bywater, M.R.C.V.S., Chief Veterinary Officer, West Ham.

GENERAL INFORMATION

*Congress Headquarters.*—The Congress headquarters in the Sun Lounge, Winter Gardens, will be open daily from 9 a.m. to 5 p.m. A lounge and writing accommodation will also be provided there.

*Congress Tickets.*—The charge for Congress admission tickets is £2 2s. These will entitle the holders to admission to the inaugural meeting and the sections and conferences, and to receive copies of the papers to be read and of the *Journal* of the Institute containing the report of the proceedings of the Congress. Fellows, members and associates of the Institute will be supplied with tickets for the Congress, free of charge, on application to the Secretary of the Institute, 90, Buckingham Palace Road, London, S.W.1, before the Congress. Guest tickets (not including copies of papers or of the proceedings) are obtainable for relatives of members, associates and delegates attending the Congress at a charge of 10s. 6d. each. Sessional tickets, which entitle the holders to attend one session of a section or conference, will be issued at a charge of 10s. 6d. each. The holders of these tickets are not supplied with free copies of the papers.

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### UNIVERSITY OF LONDON EXAMINATIONS IN VETERINARY SCIENCE

Miss Elisabeth Anne Rawson-Shaw, of the Royal Veterinary College, has passed the first examination in Veterinary Science, December, 1951.

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### ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

*Aberdeenshire.*—Tillioch, Echt, Aberdeen (Jan. 7th).

*Berks.*—Steeds Farm, Great Coxwell, Faringdon (Jan. 4th).

*Cheshire.*—Oaks Farm, Little Sutton, Wirral (Jan. 4th).

*Derbyshire.*—Toby's Hill Farm, Draycott-in-the-Clay, Derby (Jan. 4th).

*Glos.*—Home Farm, Forthampton, Gloucester (Jan. 4th).

*Kent.*—Lower Deves Farm, Harrietsham, Maidstone (Jan. 7th); Leacon Farm, Westwell Leacon, Ashford (Jan. 9th); Bowley Farm, Sandway (Jan. 10th).

*Lancs.*—Seed Green Farm, Stoneygate Lane, Ribchester, Preston (Jan. 4th); Shepherdfield Farm, Worston, Nr. Clitheroe (Jan. 5th); Wyreside Farm, Upper Rawcliffe, St. Michael's, Preston (Jan. 8th); Plane Tree Farm, Thistleton, Nr. Kirkham (Jan. 10th).

*Lincs (Parts of Landsey).*—Home Farm, Grimsthorpe, Bourne (Jan. 8th).

*Renfrewshire.*—East Lochlead Farm, Lochwinnoch, Renfrew (Jan. 10th).

*Staffs.*—Long Lane, Haughton (Jan. 7th).

*Yorks (W.R.).*—Wild Grove Farm, Tyersal, Pudsey, Leeds (Jan. 4th); Forest Moor Farm, Harrogate (Jan. 10th).

FOOT-AND-MOUTH DISEASE:

*Kent.*—Fligis Court, Hawkinge, Folkestone (Jan. 11th).

*Norfolk.*—Manor Farm, Fritton, Long Stratton (Jan. 6th).

*Suffolk (E.).*—Hatherleigh Farm, Framlingham, Woodbridge; 70, High Street, Leiston (Jan. 8th).

*Yorks (E.R.).*—Carr Farm, Warne, Hull (Jan. 7th); Weather Hill Farm, Wassand, Seaton, Hull (Jan. 10th).

(In addition, on January 10th the existence of the disease was confirmed among cattle, sheep and pigs at SEATON, HORNSEA, YORKSHIRE, and among cattle and pigs at COLDRED, DOVER, KENT.)

FOWL PEST:

*Essex.*—Roserne, Glebe Road, Ramsden Bellhouse, Billericay (Jan. 10th).

*Lancs.*—All at Preston: Pinfold Farm, Salwick, Preston (Jan. 4th); Hall Cross, Kirkham Road, Freckleton; Woodlands, Lee Lane, Lea Town (Jan. 7th); Brades Farm, Freckleton; 2, Kelemargh Cottages, Warton (Jan. 8th); Moss Farm, Midge Hall (Jan. 10th).

*Norfolk.*—Hall Farm, Hingham, Norwich (Jan. 10th).
*Suffolk (W.).*—7, St. Andrew Street North, Bury St. Edmunds (Jan. 9th).

SWINE FEVER:
*Cambs.*—79, High Street, Cottenham (Jan. 7th).
*Durham.*—Burnside Gardens, Horden (Jan. 7th).
*Essex.*—"Ionic," Barling Road, Barling (Jan. 8th).
*I. of Ely.*—Frohocks Farm, Prick Willow, Ely; Holly Tree Farm, Leverington (Jan. 7th).
*Lancs.*—Thistleton House Farm, Thistleton (Jan. 8th).
*Norfolk.*—Cherry Tree Public House, West Lynn (Jan. 7th).
*Staffs.*—87, Wood Lane, West Bromwich (Jan. 7th); Galton Estate Piggeries, Roebuck Lane, Smethwick (Jan. 10th).
*Suffolk (E.).*—Feoffee Farm, Ashbocking, Ipswich (Jan. 10th).
*Warwicks.*—Dunchurch Road Allotments, Rugby (Jan. 7th).
*Yorks (W.R.).*—Hare Park Farm, Pudsey Road, Bromley (Jan. 8th).

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## NORTHERN IRELAND ANTHRAX LEGISLATION "OUT OF DATE"

In its issue of December 27th, *The Belfast Telegraph* states that Dr. J. B. McKinney, County Medical Officer of Health, in his report to Down County Health Committee, said that the present legislation in Northern Ireland relating to anthrax was out of date. (Dr. McKinney is a brother of Mr. David F. McKinney, of Ballymena, Co. Antrim.)

*The Belfast Telegraph* quotes Dr. McKinney as saying that, in particular, the Anthrax Order of 1932 required revision. He suggested that, in any such revision, Health Committees be consulted before decisions were reached.

"The Medical Officer referred to a conference called by the Ministries of Health and Agriculture on the subject and said that at the conference no clarification of the respective responsibilities of Health Committees and the Ministries could be given. Neither was an assurance given that steps which the Committee regarded as necessary for the protection of the public in any further outbreaks, would be taken.

"'During the recent outbreak, confusion undoubtedly arose due to lack of definition of the respective spheres of responsibility and an official decision, probably at high level, is obviously indicated,' the doctor said.

"He proposed that a sub-committee examine the matter fully and formulate views for submission to the Ministry of Health and Local Government.

"The report was adopted and a sub-committee appointed to go into the matter."

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## LADY TATA MEMORIAL TRUST

The trustees of the Lady Tata Memorial Fund invite applications for grants, scholarships, or fellowships for research on diseases of the blood, with special reference to leukaemia, in the academic year beginning October 1st, 1952. Grants are made for research expenses or to provide scientific or technical assistants for senior workers. Scholarships are awarded for the personal remuneration of workers carrying out approved research under suitable direction; their normal value will be £600 for whole-time research, with a proportional adjustment for work on a part-time basis. In addition, the trustees may award one or more Lady Tata memorial research fellowships of £1,000 a year to workers with considerable experience. Further particulars and forms of application may be obtained from the Secretary of the Scientific Advisory Committee, care of the Medical Research Council, 38, Old Queen Street, Westminster, S.W.1. Applications must be submitted before March 31st.

The grants, scholarships, and fellowships are open to suitably qualified investigators of any nationality, working in any country in which it will be possible to make payments in the coming academic year.

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## BI-CENTENARY OF "WILLOWS"

In view of the long and friendly relation which has existed between the profession, the Association and this journal, and what has now become "Willows Francis Pharmaceutical Products Ltd.," we shou'd like to congratulate this fine o'd London firm of veterinary druggists on the attainment of their bi-centenary in business, and to wish them continued prosperity for at least an equal number of years to come.

A special commemoration dinner was held on December 15th, 1951, at the Holborn Restaurant, when the entire staff of the Dalston factory and several members from the Cheltenham branch were present. Mr. Guy Anderson, M.R.C.V.S., of Aylesbury, expressed the felicitations and good wishes of the veterinary profession.

# CORRESPONDENCE

*The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.*

## THE USE OF METHYL THIOURACIL ('OBESIL,' BAYER) IN PIG FATTENING

Sir,—The use of antithyroid substances in pig fattening has been reviewed by Blaxter *et al.* (1949) and by Robinson and Coey (1951), and the last-named workers have reported on experiments conducted in Northern Ireland that bear out the claims of American workers. Depression of thyroid activity during the later stages of fattening increases the economy of gains and may result in a substantial saving of food without detrimental effect on carcase quality. According to some reports the saving in food over the last few weeks of fattening may approximate 20 per cent.

It is, however, most important to restrict the administration of antithyroid substances to the later stages of fattening. Most unsatisfactory results are obtained when administration is commenced earlier or continued for long periods (Braude & Cotchin, 1949). From an experiment recently completed, and from the results of other trials made available to us, we believe not only that administration should be confined to the last month, but also that it should be discontinued during the final week.

In our experiments, two comparable groups of pigs, with a commencing individual average liveweight of 152 lb. and with average weekly gains of 14 lb. during the previous two weeks, were selected. In one group each animal was given 2 g. daily of methyl thiouracil (as 'Obesil,' Bayer) for the first 14 days and 0·5 g. subsequently, while the other group served as controls. Owing to slaughter arrangements the animals were not killed until five weeks after the commencement of the antithyroid treatment. The following mean weekly weight increases indicate that it would have been preferable to have discontinued the supplement after three weeks, and that a period of five weeks is too long:—

| | *'Obesil'* | *Controls* |
|---|---|---|
| 1st week ... | 21·1 lb. ... | 16·7 lb. |
| 2nd week ... | 18·7 lb. ... | 17·1 lb. |
| 3rd week ... | 14·7 lb. ... | 14·8 lb. |
| 4th week ... | 10·5 lb. ... | 4·1 lb. |
| 5th week ... | 7·0 lb. ... | 14·4 lb. |

Even so, the overall saving of food in the 'Obesil' group was 8 per cent. Full carcase measurements and evaluations were made, and the iodine number of individual samples of fat was determined, in order to confirm the findings of Robinson and Coey (1951). These experiments were carried out in collaboration with Messrs. E. A. Bishop (Wilts United Dairies) and Collan E. Brett (Walls Bacon Factory) and will be reported in detail in due course. We are indebted to Messrs. Bayer Products, Ltd., for supplies of the 'Obesil' used.

In another trial, conducted by a member of the profession and brought to our notice, the beneficial effect in pigs initially averaging 182 lb. was clearly greatest over the first three of the four weeks during which the 'Obesil' was fed prior to slaughter.

This preliminary note is published here since, in many cases at least, antithyroid substances will be obtained on veterinary prescription or employed under veterinary supervision. To quote Blaxter *et al.* (1949), writing at a time when they felt that practical recommendations were hardly warranted, "... modification of thyroid function shows considerable promise for application in swine husbandry. Its proper use, however, will require intelligent consideration of the principles of thyroid physiology involved." The indiscriminate use of antithyroid compounds may lead them into disrepute, and thus far there is no reason to amend the view previously expressed that they should be made available only to the specialist (Worden, 1951). Savings in food consumption commensurate with equal carcase quality and rate of gain are most desirable, but in the case of fattening pigs—and in other food animals, including poultry, for which antithyroid administration can bring about such effects—it is essential to ensure correct dosage and length of dosage period.—Yours faithfully, ALASTAIR N. WORDEN, J. BUNYAN, Cromwell House, Huntingdon.

### REFERENCES

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